Space Weather Forecast

Issued on Sunday 15 December 2024 at 13:03 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Minor/Moderate (R1/R2) radio blackouts likely at first.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low activity with a peak Common-class flare observed at 14/1729 UTC. There are six sunspot regions on the Earth-facing disc. A large region in the southwest is approaching the southwestern limb. A region in the south-centre disc is the most developmental at present, with a mature leading region, and numerous intermediate and trailing spots of smaller size. A region in the northwest has shown some decay.

A CME (coronal mass ejection) associated with a filament eruption in the southwest of the disc at 14/2240 UTC is expected to pass mostly ahead and below Earths orbit, although it may give a glancing blow with Earth later on the Day 3 (17 Dec) or early Day 4 (18 Dec).

Solar Wind / Geomagnetic Activity: Solar winds showed an ongoing slow wind regime until around 15/0740UTC at which point a weak transient CME may have been observed. Solar wind speeds were at background, typically varying between 300-350km/s, but became slightly elevated from 15/0740UTC, peaking at 420km/s at 15/1007UTC. The Interplanetary Magnetic Field (IMF), Bt, was moderate. The north-south component, Bz, oscillated between positive and negative, but favoured a weak negative direction, but became moderate at times. The net result of the above solar wind measures was for Quiet to Unsettled geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is likely, with isolated Moderate-class flares. There is a slight chance of isolated Strong-class flares.

Solar Wind / Geomagnetic Activity: A CME associated with a filament eruption in the southwest of the disc at 14/2240 UTC may give a glancing blow with Earth later on Day 3 (17 Dec) or early Day 4 (18 Dec). A connection to a high speed steam from a coronal hole in the west of the disc is expected to continue through Day 1 (15 Dec).

Geomagnetic activity is most likely to be in the Unsettled to Active range through Day 1, with a slight chance of G1 Minor Storm intervals, before easing back to background into the new UTC

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working week. Activity may then become unsettled to active again late Day 3 or early Day 4, with a chance of G1 Minor Storm intervals, in association with the CME from the filament eruption late on the 14 Dec.

Energetic Particles / Solar Radiation: There is a daily slight chance of S1/ Minor solar radiation storms or greater, in response to any notable flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	5	30	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	55	55	40	40
Very Active	R3-R5 (X Class)	No	10	10	5	5

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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